08-28-00 A

Express Mail Label No. EL697074967US

08/25/00 JC520 U.S. PTO

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No. A-377

Total Pages in this Submission

09/648590 JC586 U.S. PTO 08/25/00

TO THE ASSISTANT COMMISSIONER FOR PATENTS
Box Patent Application
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

IMAGE PROCESSING SYSTEM

and invented by:

Mitsuhiro HAMASHIMA et al

If a CONTINUATION APPLICATION, *check appropriate box and supply the requisite information:*

☐ **Continuation** ☐ **Divisional** ☐ **Continuation-in-part (CIP)** of prior application No.: _____

Which is a:

☐ **Continuation** ☐ **Divisional** ☐ **Continuation-in-part (CIP)** of prior application No.: _____

Which is a:

☐ **Continuation** ☐ **Divisional** ☐ **Continuation-in-part (CIP)** of prior application No.: _____

Enclosed are:

Application Elements

1. ☐ Filing fee as calculated and transmitted as described below
2. ☒ Specification having **11 (eleven)** pages and including the following:
   a. ☒ Descriptive Title of the Invention
   b. ☐ Cross References to Related Applications *(if applicable)*
   c. ☐ Statement Regarding Federally-sponsored Research/Development *(if applicable)*
   d. ☐ Reference to Microfiche Appendix *(if applicable)*
   e. ☒ Background of the Invention
   f. ☒ Brief Summary of the Invention
   g. ☒ Brief Description of the Drawings *(if drawings filed)*
   h. ☒ Detailed Description
   i. ☒ Claim(s) as Classified Below
   j. ☒ Abstract of the Disclosure

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No. A-377
Total Pages in this Submission

Application Elements (Continued)

3. ☒ Drawing(s) *(when necessary as prescribed by 35 USC 113)*
   a. ☒ Formal Number of Sheets **3 (three)**
   b. ☐ Informal Number of Sheets

4. ☒ Oath or Declaration
   a. ☒ Newly executed *(original or copy)* ☐ Unexecuted
   b. ☐ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*
   c. ☒ With Power of Attorney ☐ Without Power of Attorney
   d. ☐ *DELETION OF INVENTOR(S)*
   Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. 1.63(d)(2) and 1.33(b).

5. ☐ Incorporation By Reference *(usable if Box 4b is checked)*
   The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6. ☐ Computer Program in Microfiche *(Appendix)*

7. ☐ Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all must be included)*
   a. ☐ Paper Copy
   b. ☐ Computer Readable Copy *(identical to computer copy)*
   c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☒ Assignment Papers *(cover sheet & document(s))*

9. ☐ 37 CFR 3.73(B) Statement *(when there is an assignee)*

10. ☐ English Translation Document *(if applicable)*

11. ☐ Information Disclosure Statement/PTO-1449 ☐ Copies of IDS Citations

12. ☒ Preliminary Amendment

13. ☒ Acknowledgment postcard

14. ☒ Certificate of Mailing
   ☐ First Class ☒ Express Mail *(Specify Label No.):* **EL697074967US**

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No. A-377
Total Pages in this Submission

Accompanying Application Parts (Continued)

15. ☒ Certified Copy of Priority Document(s) *(if foreign priority is claimed)*

16. ☒ Additional Enclosures *(please identify below):*

Inventor Information Sheet (Patent Bibliographical Data)

Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra		Rate	Fee
Total Claims	4	- 20 =	0	x	$18.00	$0.00
Indep. Claims	1	- 3 =	0	x	$78.00	$0.00
Multiple Dependent Claims (check if applicable) ☐						$0.00
					BASIC FEE	$690.00
OTHER FEE *(specify purpose)*	**Assignment Recordation Fee**					$40.00
					TOTAL FILING FEE	$730.00

☒ A check in the amount of **$40.00** to cover the ~~filing~~ recordal fee is enclosed.

☐ The Commissioner is hereby authorized to charge and credit Deposit Account No. as described below. A duplicate copy of this sheet is enclosed.

- ☐ Charge the amount of as filing fee.
- ☐ Credit any overpayment.
- ☐ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

Dated: Aug. 25, 2000

Signature

James H. Walters, Reg. No. 35,731
DELLETT AND WALTERS
310 S.W. Fourth Avenue, Suite 1101
Portland, Oregon 97204
(503) 224-0115

cc:

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10) Applicant(s): **Mitsuhiro HAMASHIMA et al**			Docket No. **A-377**
Serial No.	Filing Date	Examiner	Group Art Unit

Invention: **IMAGE PROCESSING SYSTEM**

jc586 U.S. PTO
09/648590
08/25/00

I hereby certify that the following correspondence:

New Patent Application Transmittal (& documents & fees listed as enclosed therein)

(Identify type of correspondence)

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to: The Assistant Commissioner for Patents, Washington, D.C. 20231 on

August 25, 2000
(Date)

James H. Walters
(Typed or Printed Name of Person Mailing Correspondence)

James H. Walters
(Signature of Person Mailing Correspondence)

EL696074967US
("Express Mail" Mailing Label Number)

Note: Each paper must have its own certificate of mailing.

INVENTOR INFORMATION

Inventor One Given Name:: Mitsuhiro
Family Name:: Hamashima
Postal Address Line One:: c/o Dai Nippon Printing Co., Ltd., 1-1,
Postal Address Line Two:: Ichigaya-Kagacho 1-Chome, Shinjuku-Ku
City:: Tokyo
Country:: JAPAN
Postal or Zip Code:: 162-0062
Country of Residence:: JAPAN
Citizenship Country:: JAPAN
Inventor Two Given Name:: Yasuko
Family Name:: Deushi
Postal Address Line One:: c/o Dai Nippon Printing Co., Ltd., 1-1,
Postal Address Line Two:: Ichigaya-Kagacho 1-Chome, Shinjuku-Ku
City:: Tokyo
Country:: JAPAN
Postal or Zip Code:: 162-0062
Country of Residence:: JAPAN
Citizenship Country:: JAPAN
Inventor Three Given Name:: Hiroyuki
Family Name:: Soshi
Postal Address Line One:: c/o Dai Nippon Printing Co., Ltd., 1-1,
Postal Address Line Two:: Ichigaya-Kagacho 1-Chome, Shinjuku-Ku
City:: Tokyo
Country:: JAPAN
Postal or Zip Code:: 162-0062
Country of Residence:: JAPAN
Citizenship Country:: JAPAN

CORRESPONDENCE INFORMATION

Correspondence Customer Number:: 802
Electronic Mail One:: jwalters@teleport.com

APPLICATION INFORMATION

Title Line One:: IMAGE PROCESSING SYSTEM
Total Drawing Sheets:: 3
Formal Drawings?:: Yes
Application Type:: Utility
Docket Number:: A-377
Secrecy Order in Parent Appl.?:: No

REPRESENTATIVE INFORMATION

Representative Customer Number:: 802
Registration Number One:: 35731

09540300-060500

Express Mail #EL696077[illegible]US

PRIOR FOREIGN APPLICATIONS

Foreign Application One:: 11-252920
Filing Date:: 09-07-1999
Country:: JAPAN
Priority Claimed:: Yes

Source:: PrintEFS Version 1.0.1

09450900-080500

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Mitsuhiro Hamashima et al

S. N.

Filed: August 25, 2000

For: IMAGE PROCESSING SYSTEM

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Please make the following amendments to this application prior to examination thereof:

In the Specification:

Page 3, line 9, delete "Fig. 4 is" and substitute --Figs. 4(A) through 4(E) comprise--.

REMARKS

The above amendments are submitted to place the application into a format consistent with U.S. practice.

Respectfully submitted,

James H. Walters, Reg. No. 35,731

DELLETT AND WALTERS
Suite 1101
310 S. W. Fourth Avenue
Portland, Oregon 97204
(503) 224-0115
DOCKET: A-377

09654590 - 082500

Express Mail

TITLE OF THE INVENTION

IMAGE PROCESSING SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to image processing methods and printers.

2. Description of Background Art

In general, photographs of individuals contain a scene as a background. In many cases, such photographs cannot suitably be used as pictures for identification or the like as they are. Accordingly, it is conventional practice to remove the background and to print (solid printing) the resulting vacant portion with Bk (black) or the like with a uniform density.

However, when the background of a person's image or the like is subjected to solid printing, visible unevenness of printing occurs unfavorably because completely uniform solid printing cannot be effected owing to uneven ink coating on the transfer ribbon, variations in the energy applied to the thermal head, etc.

SUMMARY OF THE INVENTION

In view of the above-described problem with the conventional technique, an object of the present invention is to prevent visible unevenness of printing from occurring in the background portion of an image.

Express Mail #EL693919705

To attain the above-described object, the present invention provides an image processing system including an image processing unit for processing input image data and an output unit for outputting an image processed in the image processing unit. The image processing unit has the function of cutting out a background portion of the image and effecting color specification and further has the function of specifying a method of processing the background portion. When printing the image, the output unit recognizes the background portion on the basis of the color specification and carries out background processing for the recognized background portion on the basis of the specified background processing method.

Preferably, the output unit converts pixels into a pattern and prints the background portion with a discontinuous pattern on the basis of the specified background processing method.

Preferably, the pattern is a stripe pattern or a dot pattern.

Preferably, the color specification specifies a uniform density of a specific color.

Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification.

The invention accordingly comprises the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention will

be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram illustrating the system configuration of the present invention.

Fig. 2 is a flowchart showing host-side process flow.

Fig. 3 is a flowchart showing printer-side process flow.

Fig. 4 is a diagram illustrating background processing according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

An embodiment of the present invention will be described below with reference to the accompanying drawings.

Fig. 1 is a block diagram illustrating the system configuration of the present invention. The image processing system according to the present invention includes an image processing unit 1 for processing image data and an output unit 2. The output unit 2 includes a display, a printer, etc. for outputting an image processed in the image processing unit 1. Image data may be captured with a scanner 3 connected directly to the image processing system or with a video camera 4 connected to the image processing system via a video terminal. It is also possible to read image data already stored in the form of digital data on a CD-ROM 5 or a magneto-optical disk 6.

Next, image processing according to the present invention will be described with reference to Figs. 2 to 4 in regard to an example in which clipping is carried out by a manual operation, and a background pattern is manually synthesized, and then the processed image is outputted to a printer. Fig. 2 is a flowchart showing process flow carried out by the image processing unit of the present invention. Fig. 3 is a flowchart showing printer-side process flow. Fig. 4 is a diagram illustrating background processing.

First, processing carried out by the image processing unit (host-side processing) will be described with reference to Fig. 2. A desired image previously stored in an external storage unit is displayed on a display (step S1). The image is composed of R (red), G (green) and B (blue), each represented by 8 bits. On the display, the image is displayed as an image of three colors, i.e. C (cyan), M (magenta) and Y (yellow), for example, as follows:

C=255-R, M=255-G, Y=255-B

In general, photographs of individuals contain a scene as a background. In many cases, such photographs cannot suitably be used as pictures for identification as they are. Accordingly, as shown in part (A) of Fig. 4, a person's image portion of the displayed image is cut out (i.e. the background is deleted) by using publicly known retouching software (step S2). Next, a color to be used for the deleted background portion is specified. For

example, Bk (black) with 64 gradations is specified as shown in part (B) of Fig. 4 (step S3). Next, printer output software is started (step S4) to output the processed image to the printer. In outputting the image, a background processing method (described later) is specified by the printer or output software, and information indicating the specified background processing method is transmitted to the printer (step S5). After the background processing method has been specified, Y, M, C and K image data items are transferred to the printer (steps S6 to S9).

Next, printer-side processing will be described with reference to Fig. 3. The printer receives the information indicating the specified background processing method (step S11). The printer also receives the Y, M, C and K image data items and writes them into respective memories (steps S12 to S15). After receiving all of the image data, the printer feeds paper (step S16) and commences printing. For example, the printer reads the image data items from the respective memories in field sequence, i.e. Y, M and C, to carry out printing (steps S17 to S19). At the step of carrying out printing of the K image data for the background portion, the printer reads the K image data from the associated memory and performs conversion of the K image data into pattern data, writing and reading of the pattern data into and from a memory and printing of the K image data (step S20). In a case where non-processing has been specified as a background processing method, for

example, the K printing process is also effected faithfully to the image data as shown in part (B) of Fig. 4. If patterning with horizontal lines has been specified as a background processing method, the printer recognizes, prior to printing, that Bk with 64 gradations has been specified in the received data, and converts pixels into a pattern. For example, each series of vertical 4 dots of 8×8=64 pixels as shown in part (D) of Fig. 4 is replaced with 1 dot with 255 gradations as shown in part (E) of Fig. 4. Consequently, as shown in part (C) of Fig. 4, an image with the background replaced with horizontal lines drawn at intervals of 4 dots is outputted. If the background is reproduced as a striped discontinuous image area in this way, it is difficult to recognize unevenness in printing of the stripes relative to the surroundings. Thus, unevenness of density and color can be made difficult to perceive by the eye. Stripes to be printed in the background are not necessarily limited to horizontal lines but may be vertical lines, oblique lines, etc. Further, patterns to be printed in the background are not necessarily limited to stripes but may be dots or the like. By reproducing the background as a discontinuous image area using a dot or other similar pattern, it is also possible to make unevenness of density and color difficult to perceive by the eye.

Although in the above-described embodiment the color for the background is specified as a single color, i.e. K, the present invention is not necessarily limited thereto.

For example, the color for the background may be specified as C=M=Y=64 gradations, and the whole image, including the background, may be handled in the form of three-color image data, i.e. C, M and Y. In this case, a portion of the image data that has a specific combination of three colors (C, M and Y) is judged to be a background, and this portion is subjected to background processing. If ink used in the printer consists of four colors, i.e. C, M, Y and K, a portion of C=M=Y=64 gradations is judged to be a background, and this portion is replaced with K=64 gradations, for example. The replacement may be performed when the image is transferred from the host side. Alternatively, the replacement may be performed on the printer side on the basis of the received image. In this case, there is a possibility that data concerning a person's image portion may contain an area of C=M=Y=64 gradations. If this portion is replaced as in the case of the background processing, the resulting image may appear unnatural. In the case of a natural image, however, there is little probability that an area having the same combination of gradation values will be contiguously present around it. Therefore, there is a strong possibility that such replacement may be visually disregarded. Alternatively, to prevent the occurrence of the above-described problem, processing may be carried out as follows. Regarding a pixel noticed and 8 surrounding pixels, i.e. a total of 3×3 pixels, if all of the pixels have a predetermined combination of gradation values, this

area is judged to be a background. If all of the 3×3 pixels do not have a predetermined combination of gradation values, the area is judged to be a natural image. Only the area judged to be a background is subjected to the background processing. In these cases also, data representing K=64 gradations may be replaced with a pattern, e.g. lines, according to the specified background processing as in the case of the above.

In a case where ink used in the printer consists of three colors, i.e. C, M and Y, data concerning the background is replaced with K data, and this is further replaced with a pattern. Then, the data is returned to a combination of three colors, i.e. C, M and Y. By doing so, a similar effect can be produced. If K=64 is replaced with horizontal lines drawn at intervals of 4 dots as in the above-described example, printing is effected with K=255. In this case, it is possible to print the background with a desired color while pattering it by using a desired combination of three colors, e.g. C=255, M=200 and Y=180. In this case, background processing may be carried out directly, without performing replacement with K data, by judging a portion of C=M=Y=64 to be a background.

In the foregoing embodiments, the present invention has been described with regard to a case where the background has a uniform density. It should be noted, however, that gradation may be given to the background, or a design may be put in the background. In the above-described example, gradation can be given to the

background by changing the gradation values of the straight lines or changing the line pitch. It is also possible to represent only the background by the dot area modulation method, for example, on the basis of 4×4 data concerning the original image instead of using straight lines.

As has been stated above, according to the present invention, the background of an image is reproduced as a discontinuous image area using a pattern such as a stripe pattern. Consequently, it is difficult to recognize unevenness in printing of the pattern relative to the surroundings. Thus, unevenness of density and color can be made difficult to perceive by the eye.

It should be noted that the present invention is not limited to the foregoing embodiments but can be modified in a variety of ways.

WHAT IS CLAIMED IS:

1. An image processing system comprising:

an image processing unit for processing input image data; and

an output unit for outputting an image processed in the image processing unit;

wherein said image processing unit has a function of cutting out a background portion of the image and effecting color specification and further has a function of specifying a method of processing the background portion, and when printing the image, said output unit recognizes the background portion on basis of said color specification and carries out background processing for the recognized background portion on basis of said specified method of processing the background portion.

2. An image processing system according to claim 1, wherein said output unit converts pixels into a pattern and prints the background portion with a discontinuous pattern on basis of the specified method of processing the background portion.

3. An image processing system according to claim 2, wherein said pattern is one of a stripe pattern and a dot pattern.

4. An image processing system according to claim 1, wherein said color specification specifies a uniform density of a specific color.

Express Mail #EL896077967US

ABSTRACT

An image processing system including an image processing unit for processing input image data and an output unit for outputting an image processed in the image processing unit. The image processing unit has the function of cutting out a background portion of the image and effecting color specification and further has the function of specifying a method of processing the background portion. When printing the image, the output unit recognizes the background portion on the basis of the color specification and carries out background processing for the recognized background portion on the basis of the specified background processing method. It is possible to prevent visible unevenness of printing from occurring in the background portion.

Express Mail

FIG. 1

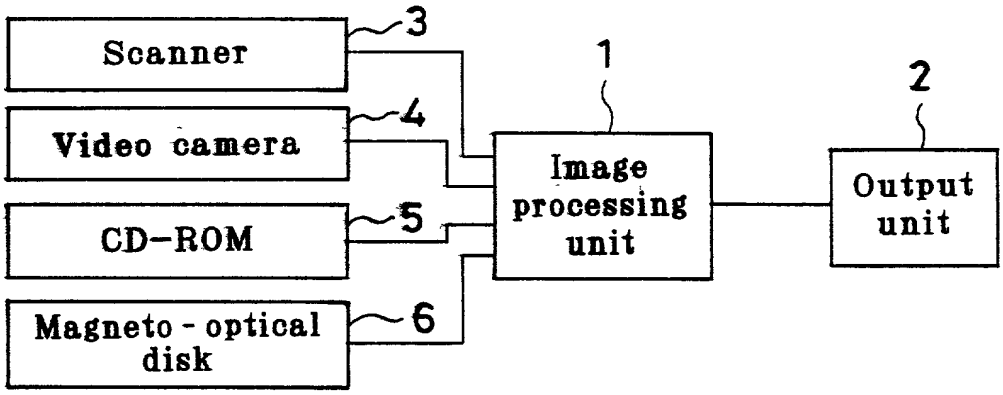
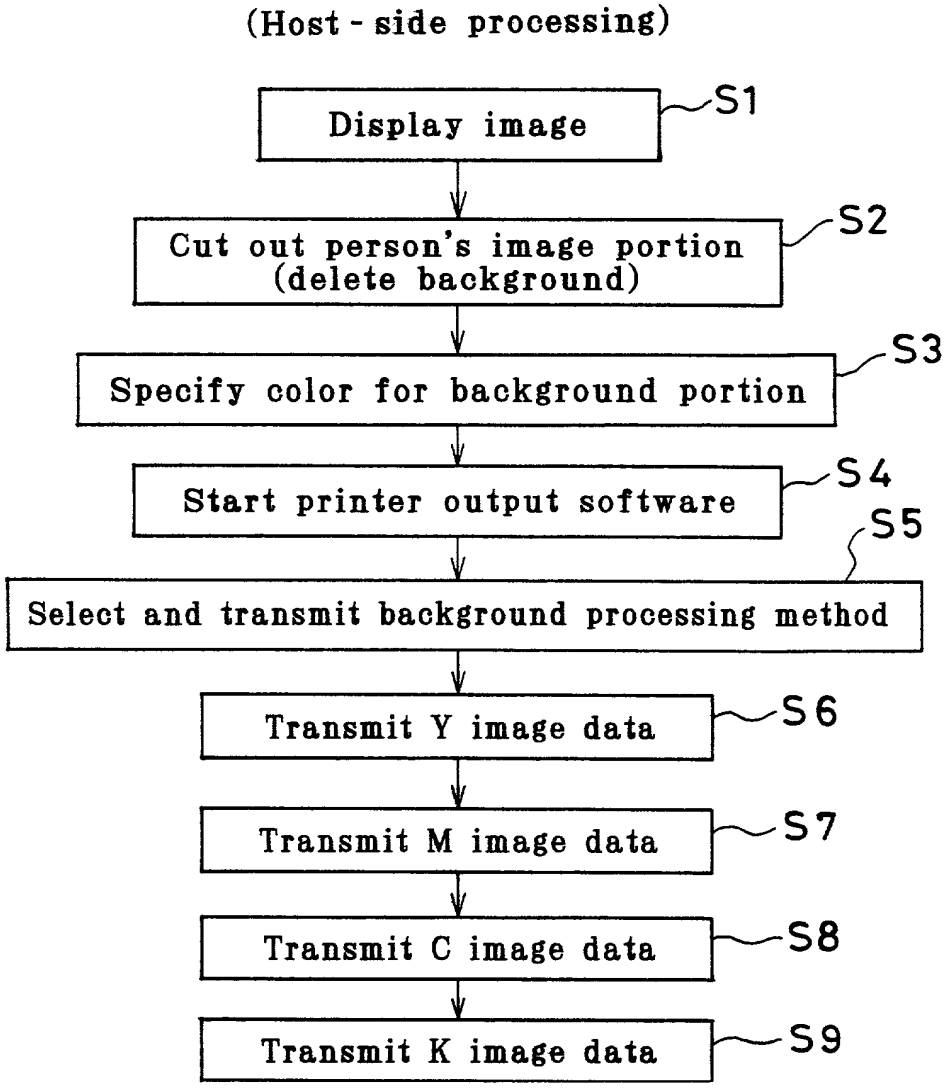
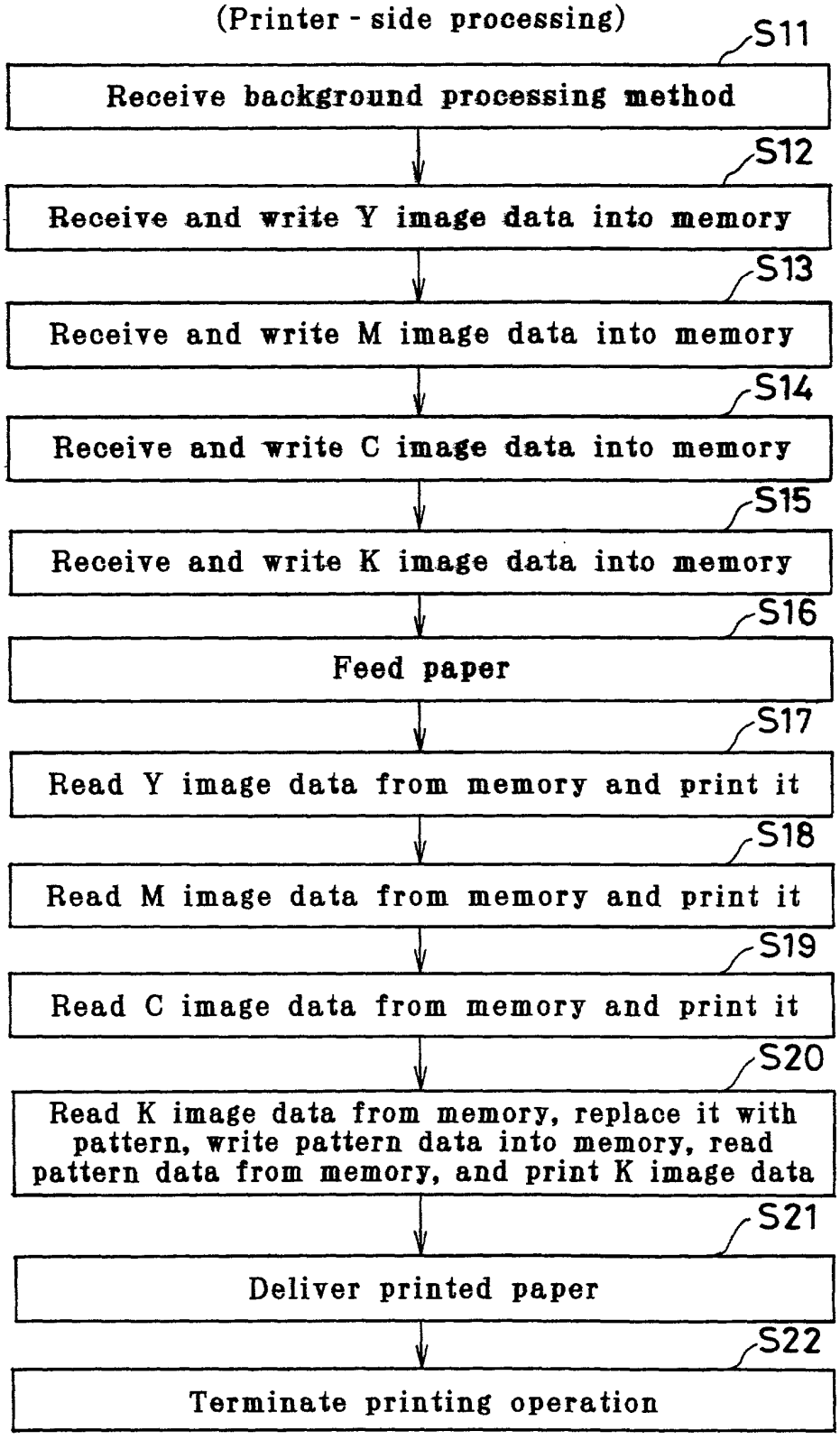


FIG. 2



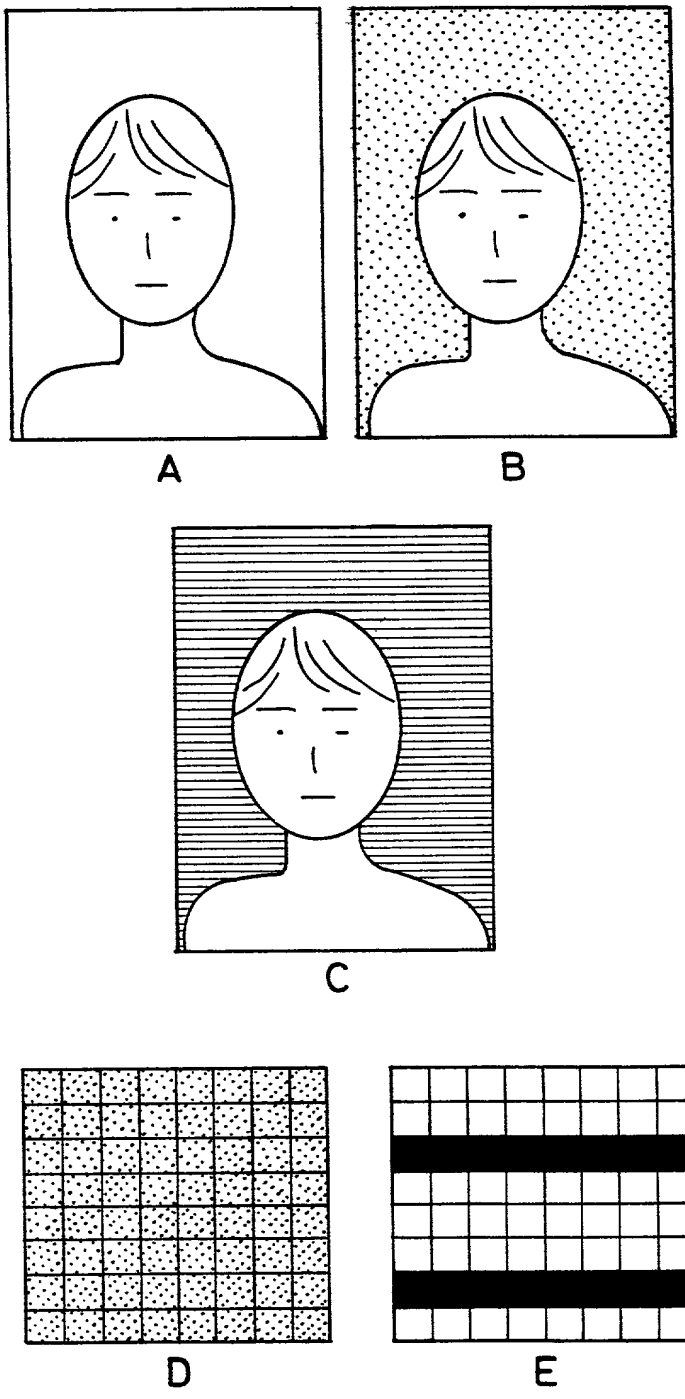
Express Mail #EL694374967

FIG. 3



US 6,285,468 B1

FIG. 4



Attorney's Docket No. A-377

COMBINED DECLARATION AND POWER OF ATTORNEY
(ORIGINAL APPLICATION)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name, I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

IMAGE PROCESSING SYSTEM

the specification of which is attached hereto unless box (a) or (b) is checked, in which case

(a) [ ] the specification was filed on _____ as Application Serial No. _____.

(b) [ ] the specification was filed as PCT International Application No. _____ filed on _____ and was amended under PCT Art. 19 on _____ (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, sec. 1.56.

I have identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America and filed less than 12 months (6 months for designs) prior to this United States application and of which I claim foreign priority benefits under Title 35, United States Code, sec. 119, and I have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

EARLIEST FOREIGN APPLICATION, AND ALL FOREIGN APPLICATIONS FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U. S. APPLICATION

Country	Application No.	Date of Filing (Month/day/year)
Japan	11-252920	09/07/99

Express Mail #EL690749705

09454500 - 090500

As a named inventor, I hereby appoint the following attorneys to prosecute this application and transact all business in the Patent and Trademark Office connected therewith and in connection with the resulting patent:

James H. Walters, Reg. No. 35,731
Michael O. Scheinberg, Reg. No. 36,919

Send correspondence to:

DELLETT AND WALTERS
310 S. W. Fourth Avenue
Suite 1101
Portland, Oregon 97204

(503) 224-0115

I authorize the attorneys that I have appointed to accept instructions regarding this application and the resulting patent from Azusa Patent Office.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Title 18, United States Code, sec. 1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of **sole or first joint inventor** Mitsuhiro HAMASHIMA

Inventor's signature Mitsuhiro HAMASHIMA

Date August 10, 2000 Country of Citizenship JAPAN

Residence Same as post office address

Post Office Address c/o DAI NIPPON PRINTING CO., LTD.,
1-1, Ichigaya-Kagacho 1-Chome, Shinjuku-Ku, TOKYO 162-0062 JAPAN

Full name of **second joint inventor**, if any Yasuko DEUSHI

Inventor's signature Yasuko Deushi

Date August 10, 2000 Country of Citizenship JAPAN

Residence Same as post office address

Post Office Address c/o DAI NIPPON PRINTING CO., LTD.,
1-1, Ichigaya-Kagacho 1-Chome, Shinjuku-Ku, TOKYO 162-0062 JAPAN

Full name of **third joint inventor**, if any Hiroyuki SOSHI

Inventor's signature Hiroyuki Soshi

Date August 10, 2000 Country of Citizenship JAPAN

Residence Same as post office address

Post Office Address c/o DAI NIPPON PRINTING CO., LTD.,
1-1, Ichigaya-Kagacho 1-Chome, Shinjuku-Ku, TOKYO 162-0062 JAPAN

Full name of **fourth joint inventor**, if any _____

Inventor's signature _____

Date _____ Country of Citizenship _____

Residence _____

Post Office Address _____

_____

Full name of **fifth joint inventor**, if any _____

Date _____ Country of Citizenship _____

Residence _____

Post Office Address _____

_____

Full name of **sixth joint inventor**, if any _____

Inventor's signature _____

Date _____ Country of Citizenship _____

Residence _____

Post Office Address _____

_____

Full name of **seventh joint inventor**, if any _____

Inventor's signature _____

Date _____ Country of Citizenship _____

Residence _____

Post Office Address _____

_____

09548560-082500